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Additional Records of Ectoparasites on Delaware Mammals¹

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In 1945, MacCreary (1945a) published a list of ectoparasites taken from Delaware mammals. The present study is a follow-up of his original effort offering additional information on parasites of five mammalian hosts.

Other records of Delaware ectoparasites have been published by Ewing (1938) who listed *Myobia musculi* Schrank from *Mus musculus* L. (collected by H. S. Peters, Ft. DuPont, Delaware City; IV-13-33); Holland (1950), who reported on a Ceratophyllid flea from the State; MacCreary (1945b) and Darsie and Anastos (1957), who recorded Ixodidae from Delaware; MacCreary and Catts (1954), who worked on poultry parasites; and Scanlon and Johnson (1957), who referred to Polyplacine lice from this State.

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PROCEDURE

All hosts were captured alive in boxtraps during the winter of 1958. The rodents were sacrificed and enclosed in pint-sized ice cream cartons for 24 hours, then the parasites were picked from host and carton and preserved in 70 per cent alcohol. Additional specimens were recovered by brushing with a leaf brushing machine developed by Henderson and McBurnie (1943). The larger mammals were caught during a rabbit trapping and transplanting program conducted by the Delaware Board of Game and Fish Commissioners. They were necessarily examined alive. There was no attempt to collect all the parasites from the rabbits.

Representative parasites from each animal were selected and mounted for study.

RESULTS

The following mammals, common in Delaware, were examined for ectoparasites: meadow mouse, *Microtus pennsylvanicus* (Ord), house mouse, *Mus musculus* Linné, deer mouse, *Peromyscus leucopus* (Rafinesque), cottontail rabbit, *Sylvilagus floridanus* (Allen), and opossum, *Didelphis virginiana* Kerr. Although only 28 specimens were inspected, a total of 1142 parasitic arthropods were recovered. Even so, not all the parasites were removed from all hosts. Table 1 lists the number of hosts parasitized by each of the arthropod orders. The meadow mice were by far the most heavily infested, and likewise had the largest number of species.

About one-fourth of the ectozoans were identified to species. They are tabulated in table 2, along with their hosts. The known Delaware records and a discussion of the ectoparasite species follow.

ACARINA

Haemolaelaps glasgowi (Ewing)

Newark, New Castle Co., ex *Microtus pennsylvanicus*, III-26-58, 2 ♀♀; III-27-58, 3 ♀♀; III-28-58, 3 ♀♀; IV-17-58,

3 ♀♀; ex *Peromyscus leucopus*, IV-3-58, 1 ♀ (O. Florschütz). MacCreary (1945a) listed this species under the genus *Atricholaelaps*. In addition to the above hosts, he named *Blarina brevicauda* (Say) and *Pitymys pinetorum pinetorum* (Lec.). This is probably the most widely distributed parasitic mite both geographically and in terms of numbers of hosts; see Strandmann (1949), Baker et al. (1956), Hays and Guyton (1958) and Allred (1958). It has been reported from Africa by Zumpt and Till (1956).

TABLE 1. Number of Parasites Taken from Each Mammalian Host, Delaware, 1958

Host	Number Examined	Acarina		Anoplura		Siphonaptera	
		No. Hosts Infested	Total Number	No. Hosts Infested	Total Number	No. Hosts Infested	Total Number
<i>Microtus pennsylvanicus</i>	11	11	672	10	232	1	1
<i>Mus musculus</i>	3	1	10	0		0	
<i>Peromyscus leucopus</i>	1	1 ¹	100	0		0	
<i>Sylvilagus floridanus</i>	11	0		0		11 ¹	126
<i>Didelphis virginiana</i>	2	0		0		1	1
Total	28	13	782	10	232	13	128

¹ Not all the ectoparasites were removed from these hosts.

Haemolaelaps spp.

Newark, New Castle Co., ex *Microtus pennsylvanicus*, III-17-58, 1 nymph (O. Florschütz). Specific identification was not possible due to its immaturity.

Listrophorus spp.

Newark, New Castle Co., ex *Microtus pennsylvanicus*, III-27-58, 4 ♀♀; III-31-58, 2 ♀♀; ex *Peromyscus leucopus*, IV-3-58, 1 ♀. This mite genus has never before been reported from Delaware.

Laelaps alaskensis Grant

Newark, New Castle Co., ex *Microtus pennsylvanicus*, III-10-58, 4 ♀♀, 3 ♂♂; III-17-58, 4 ♀♀, 1 ♂; III-26-58, 6 ♀♀.

2 ♂♂; III-27-58, 6 ♀♀, 1 ♂; III-28-58, 6 ♀♀, 1 ♂; III-31-58, 3 ♀♀, 1 ♂; IV-5-58, 8 ♀♀; IV-17-58, 2 ♀♀; ex *Peromyscus leucopus*, IV-3-58, 7 ♀♀ (O. Florschütz). This is a new record for Delaware, but may have been included in the *Laelaps* spp. of MacCreary (1945a). It was one of the commonest mites on the meadow mice. The identification key of Pratt and Lane (1953) was useful in separating the two species of *Laelaps*.

***Laelaps kochi* Oudemans**

Newark, New Castle Co., ex *Microtus pennsylvanicus*, III-10-58, 1 ♀; III-17-58, 3 ♀♀, 1 nymph; III-26-58, 4 ♀♀, 1 nymph; III-27-58, 3 ♀♀, 1 ♂; III-28-58, 2 ♀♀; III-31-58, 1 ♀, 2 ♂♂; IV-5-58, 9 ♀♀, 2 ♂♂; IV-17-58, 2 ♀♀ (O. Florschütz). This species was reported from Delaware by MacCreary (1945a) under the name *Laelaps microti* (Ewing). The role of this mite as a possible natural vector of tularemia was suggested by Grzhebin (1939).

***Radfordia affinis* (Poppe)**

Newark (Cowtown), New Castle Co., ex *Mus musculus*, IV-3-58, 4 ♀♀, 2 ♂♂ (O. Florschütz). This is likewise a new Delaware mite record. This mite was the only one taken from *M. musculus*, despite thorough examination of the host. Ewing (1938) stated that he examined house mice from Delaware and failed to find this species.

ANOPLURA

***Hoplopleura acanthopus* (Burmeister)**

Glasgow, New Castle Co., ex *Microtus pennsylvanicus*, VI-7-39, 3 ♀♀, 1 ♂ (D. MacCreary); Newark, New Castle Co., ex house mouse, VI-28-39, 1 ♂ (E. J. Gerberg); ex *M. pennsylvanicus*, III-10-58, 1 ♀, 2 ♂♂; III-17-58, 4 ♀♀, 2 ♂♂; III-26-58, 7 ♀♀, 1 ♂; III-27-58, 12 ♀♀; III-31-58, 1 ♀, 3 ♂♂; IV-5-58, 4 ♀♀, 4 ♂♂ (O. Florschütz). This is the most common rodent louse found in Delaware. It was also recorded

from *Peromyscus leucopus* and *Mus musculus* in Delaware by MacCreary (1945a). The ecology of this louse was discussed by Cook and Beer (1955). It is interesting to note that, in large samples taken in Minnesota, they never found *H. acanthopus* on deer mice of the genus *Peromyscus*. Conversely, *Hoplopleura hesperomydis* (Osborn) was the *Peromyscus* louse and never found on voles of the genera *Microtus* and *Clethrionomys*, the hosts of *H. acanthopus*.

TABLE 2. List of Ectoparasites Collected in New Castle County, Delaware, 1958, and Their Hosts

Parasite	Host Species				
	<i>Microtus pennsylvanicus</i>	<i>Mus musculus</i>	<i>Peromyscus leucopus</i>	<i>Sylvilagus floridanus</i>	<i>Didelphis virginiana</i>
ACARINA					
<i>Haemolaelaps glasgowi</i>	11		1		
<i>Haemolaelaps</i> spp.	1				
<i>Laelaps alaskensis</i> ¹	48		7		
<i>Laelaps kochi</i>	32				
<i>Listrophorus</i> spp.	6		1		
<i>Radfordia affinis</i> ¹		6			
ANOPLURA					
<i>Hoplopleura acanthopus</i>	41				
<i>Polyplax alaskensis</i>	2				
SIPHONAPTERA					
<i>Cediopsylla simplex</i>				109	
<i>Megabothris asio asio</i>	1				
<i>Odontopsyllus multispinosus</i> ¹				1	
<i>Oropsylla arctomys</i>					1
Total	142	6	9	110	1

¹ New records for Delaware.

Polyplax alaskensis Ewing

Newark, New Castle Co., ex *Microtus pennsylvanicus*, III-28-58, 1 ♀; III-31-58, 1 ♂ (O. Florschütz). The male was associated with *H. acanthopus*, while the female was the only louse found on its host. Although this species was not found by MacCreary (1945a), it was recorded from Delaware by Scanlon and Johnson (*loc. cit.*) but without any locality data.

It is interesting to note that Beer and Cook (1958), in a study of lice on *Peromyscus* in Oregon, found one species each

of *Hoplopleura (hesperomydis)* and *Polyplax (auricularis)* Kellogg and Ferris), and in about the same ratio as in the present study, i.e., the former was much more abundant.

SIPHONAPTERA

Cediopsylla simplex (Baker)

Masten Corners, Kent Co., ex rabbit, VI-22-39, 1 ♀ (D. MacCreary); Newark, New Castle Co., ex *Sylvilagus floridanus*, I-17-58, 3 ♀♀, 2 ♂♂; I-18-58, 2 ♀♀, 1 ♂; I-20-58, 7 ♀♀, 2 ♂♂; I-22-58, 3 ♀♀, 7 ♂♂; I-24-58, 21 ♀♀, 10 ♂♂; II-1-58, 7 ♀♀, 2 ♂♂; II-4-58, 5 ♀♀, 3 ♂♂; II-11-58, 7 ♀♀, 7 ♂♂; II-12-58, 3 ♀♀, 7 ♂♂; IV-8-58, 5 ♀♀, 5 ♂♂ (O. Florschütz). This flea was found in great abundance on all rabbits examined. From 5 to 20 fleas were collected per animal. MacCreary (1945a) listed this species on *Marmota monax monax* (L.) but not on rabbit; the above data apparently serve as a new host record for Delaware. *C. simplex* was found to be most numerous among the New Jersey Siphonaptera, by Burbutis (1956).

Megabothris asio asio (Baker)

Delaware City, New Castle Co., ex *Microtus pennsylvanicus*, V-20-39, 1 ♂ (D. MacCreary); Camden, Kent Co., ex *M. pennsylvanicus*, VI-25-39, 1 ♂ (R. Traub); New Castle, New Castle Co., ex meadow mouse, VII-29-39, 1 ♂ (D. MacCreary); Newark, New Castle Co., ex *M. pennsylvanicus*, IV-4-58, 1 ♀ (O. Florschütz). MacCreary (1945a) registered it from Delaware. The first two records given above were published by Holland (1950). He also figured parts of a female from New Castle, Delaware (see his fig. 2).

Odontopsyllus multispinosus Baker

Newark, New Castle Co., ex *Sylvilagus floridanus*, I-20-58, 1 ♀ (O. Florschütz). This is a new Delaware flea record. Only a single female was collected in 110 rabbit fleas. The species

was found to be the second most common flea on rabbits in New Jersey by Burbutis (1956).

Oropsylla arctomys (Baker)

Yorklyn, New Castle Co., ex ground hog, VI-1-39, 1 ♀ (D. MacCreary); Newark, New Castle Co., ex *Didelphis virginiana*, III-7-58, 1 ♀ (O. Florschütz). The latter is a new host record for Delaware and appears to be a rare host relationship. According to Jellison and Good (1942), the first to report it was Jordan (1928) from Ligonier, Westmoreland Co., Pennsylvania. Fox (1940) included it as a host of *D. virginiana* in his host index. Recently Hamilton (1958), in a study of the life history and economic relations of the opossum in New York State, noted that this flea was recovered from a few individuals, but it was not nearly so abundant as on woodchucks.

SUMMARY

During the winter of 1958, 28 small mammals were live-trapped in the vicinity of Newark, Delaware, and examined for ectoparasites. Five species of hosts were captured: *Microtus pennsylvanicus*, *Mus musculus*, *Peromyscus leucopus*, *Sylvilagus floridanus*, and *Didelphis virginiana*. A total of 1142 parasites was recovered and 268 of them were mounted and identified. The rodent hosts were sacrificed and stored in individual pint containers for 24 hours. The detached parasites were then collected and preserved in 70% alcohol. Additional parasites were collected by vigorous brushing. From the other hosts, specimens were picked off by hand. During this study, there were identified 113 mites of 6 species, 43 lice of 2 species, and 112 fleas of 4 species. Two of the mites, *Laclaps alaskensis* Grant, and *Radfordia affinis* (Poppe), and one flea, *Odontopsyllus multispinosus* Baker, are new records for Delaware.

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